

WHAT IS CLAIMED IS:

1. An extractor tool for extracting, from a keyway, a broken key portion of a cut key, the broken key portion including a contact surface area, the extractor tool comprising a single-axis acting device including:

- (a) a handle member; and
- (b) a tool member having a first end for connecting to said handle member, and a second and distal end for inserting into the keyway containing the broken key portion, said second and distal end including a contoured jaw section for acting along a single axes in contacting said contact surface area on said broken key portion, and for maximizing a contact area between said contoured jaw section and said contact surface area, said contoured jaw section being contoured to follow said contact surface area on said broken key portion, and including friction means covering a wide area of said contoured jaw section.

2. The extractor tool of Claim 1, wherein said friction means are formed from a start of said jaw section through to a tip of said tool member for enabling multiple point gripping of said contact surface area of said broken key portion.

3. The extractor tool of Claim 1, wherein said tool member is generally flat including first and second sides, a first edge, and a second and opposite edge.

4. The extractor tool of Claim 1, wherein said tool member is made from spring steel for providing lateral tool strength.

5. The extractor tool of Claim 1, wherein said distal tip is pointed for prying under tumbler pins resting against any surface area of the broken key portion.

6. The extractor tool of Claim 2, wherein said friction means comprise a series of teeth.

7. The extractor tool of Claim 3, wherein said first edge extends from said first end to said second end of said tool member, and said second and opposite edge includes said jaw section.

8. The extractor tool of Claim 3, wherein said jaw section extends diagonally from said second and opposite edge to said first edge of said tool member.

9. The extractor tool of Claim 3, wherein said tool member has a first side to second side thickness that is narrow enough for enabling it to be insertable through a narrow warded portion of a keyway.

10. The extractor tool of Claim 3, wherein said tool member has a maximum first edge to second edge dimension that is short enough for enabling it to be insertable in a space within the keyway below released tumblers.

11. The extractor tool of Claim 6, wherein said series of the teeth are formed all along said jaw and in decreasing teeth size towards a tip of said tool member.

12. The extractor tool of Claim 6, wherein each tooth of said series of teeth is formed at an angle to said contoured surface of said contoured jaw.

13. The extractor tool of Claim 6, wherein each tooth of said series of teeth has a curved inner surface for enabling a tip thereof to grip and claw increasingly into said contact surface area.

14. An extractor tool comprising:

- (a) a mid-portion having a first end and a second and opposite end;
- (b) a handle portion connected to said first end of said mid-portion and extending rearwards of said mid-portion; and
- (c) a tool portion connected to, and extending forwardly from, said second and opposite end of said mid-portion, said tool portion having a longitudinal axis, and a distal end including an extracting jaw having a friction surface for contacting and gripping a broken key portion within a keyway, said friction surface being angled relative to said longitudinal axis, and being contoured, for maximizing contact thereof with a slope of a key biting on the broken key portion.

15. An extractor tool for extracting a removable piece from within a recess, the extractor tool comprising:

- (a) a handle portion extending longitudinally and having a vertical axis and a first longitudinal axis;
- (b) a mid-portion having a second longitudinal axis, said mid-portion being connected to said handle portion and including a bend extending at a first angle to said vertical axis for enhancing positioning of a tool portion by leveraging manipulation of said handle portion; and
- (c) a tool portion connected to, and extending forwardly from said mid-portion and at a second angle to said second longitudinal axis, said tool portion having a first side surface, a second and opposite side surface, a third longitudinal axis substantially parallel to said first longitudinal axis, and a distal end including an extracting jaw having a friction surface angled relative to said third longitudinal axis for contacting and gripping the removable piece within said recess.

16. The extractor tool of Claim 15, wherein said bend of said mid-portion is in a direction to a first side of said vertical axis when the tool is placed on a surface with said first side surface of said tool portion facing down.

17. The extractor tool of Claim 15, wherein said bend of said mid-portion is in a direction to a second side of said vertical axis when the tool is placed on a surface with said second side surface of said tool portion facing down.

18. The extractor tool of Claim 15, wherein said friction surface is contoured relative to a slope of a key biting on the broken key portion for maximizing contact thereof with said slope.

19. An extractor tool for extracting, from a keyway, a broken key portion of a cut key, the broken key portion including at least two opposite key biting slopes, the extractor tool comprising:

- (a) a dual-axes acting mechanism including two single-axis acting devices attached together pivotably for opening and closing movements in a scissors manner,

- (b) an acting axis of one of said two single-axis acting devices as attached being offset from and apposite relative to that of the other of said two single-axis acting devices;

- (c) each said single-axis acting device having:

- (i) a handle member and;

- (ii) a tool member, said tool member including a first end for connecting to said handle member, and a second and distal end for inserting into the keyway containing the broken key portion, said second and distal end including a contoured jaw section contoured to follow said one of said at least two opposite key biting slopes on said broken key portion, and said contoured jaw section including friction means, thereby enabling said dual-axes mechanism to make two offset and apposite jaw-contacts, one with each key biting slope on each edge of a double-edge broken key portion for extraction.

20. The extractor tool of Claim 19, wherein said friction means comprise a series of angled teeth.

21. The extractor tool of Claim 19, wherein each tooth of said series of teeth has a curved inner surface for enabling a tip thereof to grip and claw increasingly into said contact surface area.

22. The extractor tool of Claim 21, wherein said bend of said mid-member is in a first direction to a first side of said vertical axis when a single-axis acting device is placed on a surface with a first side surface of said tool member facing down.

23. The extractor tool of Claim 21, wherein said bend of said mid-member is in a second direction to a second side of said vertical axis when a single-axis acting device is placed on a surface with said second side surface of said tool member facing down.

24. The extractor tool of Claim 21, wherein for up and down positioned keyways, said two single-axis acting devices are attached as a right side device and a left side device for right-over-left (ROL) keyways, wherein movement of said right side device during closing of said dual-axes mechanism is from up to down, and movement of said left side device during closing of said dual-axes mechanism is from down to up.

25. The extractor tool of Claim 21, wherein for up and down positioned keyways, said two single-axis acting devices are attached right-to-left, comprising a right side device and a left side device, for left-over-right (LOR) keyways wherein movement of said left side device during closing of said dual-axes mechanism is from up to down, and movement of said right side device during closing of said dual-axes mechanism is from down to up.

26. A method of extracting from a lock keyway having two spaced apart opposing side surfaces, two spaced apart opposing edges, a series of lock tumblers, and a longitudinal axis, a broken key portion, the broken key portion including a broken end and a contact surface area such as a key biting having a key biting slope, the method comprising:

(a) longitudinally inserting into said lock keyway a single-axis acting device having a distal tip, a first edge, and a second edge including an extracting jaw having a friction surface contoured relative to said key biting slope for maximizing contact between said friction surface and said key biting slope within said lock keyway;

(b) contacting said broken end of said broken key portion with said distal tip;

(c) moving said first edge of said single-axis acting device towards one of said two spaced apart and opposing edges of said lock keyway;

(d) further moving said distal tip and said contoured friction surface longitudinally into said keyway and said contoured friction surface into a contoured mating relationship with a surface area of the broken key portion; and

(e) simultaneously pressing said contoured friction surface into said surface area of the broken key portion and pulling said single-axis acting device longitudinally back out of said keyway, thereby gripping and extracting said broken key portion out of said keyway.

27. The method of Claim 26, including using said first edge of said single-axis acting device for moving interfering tumblers back out of said keyway during longitudinally inserting into said keyway.

28. The method of Claim 26, including inserting a pointed portion of said distal tip through a clearance gap between said one of said spaced apart and opposing edges of said keyway and an apex of said key biting slope.

29. The method of Claim 26, wherein said longitudinally inserting function comprises inserting a first one and a second one of said single-axis acting device pivotably assembled for movement in a scissors manner.

30. The method of Claim 26, wherein moving said first edge of said single-axis acting device towards one of said two spaced apart and opposing edges includes contacting and displacing any interfering tumblers, of said series of tumblers, intruding into said keyway upstream of said broken end of said broken key portion relative to tool insertion.

31. The method of Claim 26, wherein further moving said distal tip and said contoured friction surface longitudinally into said keyway includes further contacting and displacing any tumblers, of said series of tumblers, sitting in a key biting on said broken key portion downstream of said broken end of said broken key portion relative to tool insertion.

32. The method of Claim 29, wherein said simultaneous pressing and pulling function comprises closing handle portions of said first one and said second one of said single-axis acting device.

33. The method of Claim 32, including closing handle portions of said first one and said second one of said single-axis acting device before longitudinally inserting the distal tips thereof into said keyway.

34. The method of Claim 33, wherein radially moving said first edge comprises opening the handle portions of said first one and said second one of said single-axis acting device after longitudinally insertion.

35. The method of Claim 33, wherein said keyway includes a vertical axis and said first one and said second one of said single-axis acting device are attached in a first manner so that when longitudinally inserted, said first one of said single-axis acting device is offset to a first side of said vertical axis, and said second one of said single-axis acting device is offset to a second and opposite side of said vertical axis.

36. The method of Claim 35, wherein said keyway includes a vertical axis and said first one and said second one of said single-axis acting device are attached in a second manner so that when longitudinally inserted, said first one of said single-axis acting device is offset to said second and opposite side of said vertical axis, and said second one of said single-axis acting device is offset to said first side of said vertical axis.

37. An extractor tool for extracting, from a recess, removable items including heavy items and items that can rotate within the recess, the extractor tool comprising:

- (a) a triple-axes acting mechanism including three single-axis acting devices attached together pivotably for opening and closing movements in a scissors manner,

- (b) an acting axis of one of said three single-axis acting devices as attached being offset from and apposite relative to acting axes of the other two of said three single-axis acting devices;

- (c) each said single-axis acting device having:

- (i) a handle member and;

(ii) a tool member, said tool member including a first end for connecting to said handle member, and a second and distal end for inserting into the recess containing the removable item, said second and distal end including a contoured jaw section for maximizing a contact area between said contoured jaw section and said removable item, said contoured jaw section including friction means covering a wide area of said contoured jaw section, thereby enabling said triple-axes mechanism to make three offset jaw-contacts, one contact across from two contacts with said removable item for removal in a torque-free manner.

38. The extractor tool of Claim 37, wherein said friction means comprise a series of angled teeth.

39. The extractor tool of Claim 37, wherein said acting axis of said one of said three single-axis acting devices as attached is located apposite to and between said acting axes of said other two of said three single-axis acting devices.

40. The extractor tool of Claim 38, wherein each tooth of said series of teeth has a curved inner surface for enabling a tip thereof to grip and claw increasingly into said contact surface area.